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WATER QUALITY MANAGEMENT STUDY, BOSTON HARBOR, MASSACHUSETTS, PROJECTIONS OF POPULATION AND MUNICIPAL WASTE LOADINGS

Federal Water Quality Administration
Needham Heights, Massachusetts

September 1970

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WATER QUALITY MANAGEMENT STUDY
BOSTON HARBOR, MASSACHUSETTS
PROJECTIONS OF POPULATION
AND MUNICIPAL WASTE LOADINGS

This report has been formulated as part of the development of an overall water quality management plan being prepared for the Boston Harbor Drainage Area by the Boston Harbor Water Quality Management Coordinating Group. The group includes leadership by the Massachusetts Division of Water Pollution Control and the Water Quality Office of the Environmental Protection Agency and membership of the Metropolitan District Commission, the Metropolitan Area Planning Council and the City of Boston with the New England River Basins Commission serving as the coordinating vehicle.

The information contained in this report represents the views and evaluations of these agencies who contributed to its preparation.

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September 1970

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I. PURPOSE OF REPORT

The goal of the Boston Harbor Water Quality Management Study is to develop a total water quality management program for the harbor and tributary area to insure the waters will meet established water quality standards and will be capable of supporting all legitimate water uses. Both technical and socio-political inputs will be evaluated.

Necessary technical inputs include estimates of the present and future sources of wastes and their magnitude. The sources include municipal and industrial waste discharges, combined sewer and storm water overflows, wastes from watercraft and others.

This report presents an estimate of future waste flows and waste loads from municipalities within the Boston Harbor study area. Waste loads are presented in terms of BOD (biochemical oxygen demand). The BOD is a measure of the amount of oxygen required for the aerobic biological oxidation of the organic matter present in the water and is normally measured at 20°C for a five-day period. Large concentrations of oxygen demanding wastes may cause excessive reductions in the available oxygen dissolved in the receiving water and result in loss of desirable aquatic life and fish populations.

Other constituents of municipal wastes, such as bacteria and nutrients, will also be investigated but are not presented in this report.

This estimate, along with other inputs, is intended to serve as a reasonable basis for testing alternate plans and for developing future action recommendations for Boston Harbor water quality.

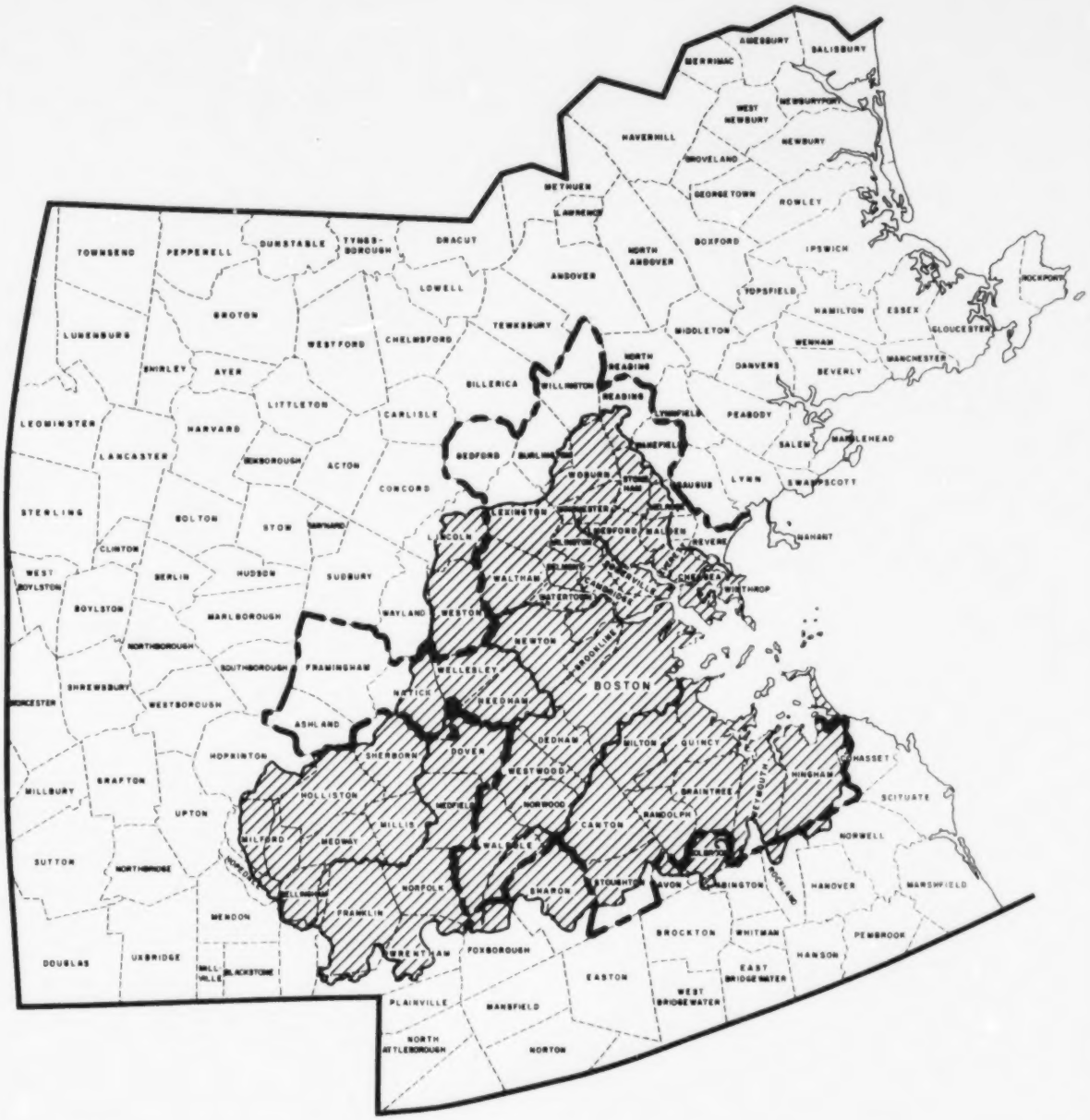
II. BASIN DESCRIPTION

Boston Harbor receives the drainage and/or the waste discharged from four major coastal streams: The Mystic, Charles, Neponset and Weymouth Fore Rivers; the entire waterfront and minor tributary areas extending from Winthrop to Hull; and all municipalities which are part of the Metropolitan District Commission sewerage system. The study area, therefore, includes the entire Boston Harbor drainage area and those communities that are outside of the drainage area but contribute wastes to the MDC (Metropolitan District Commission) sewerage system (see Figure 1). This area contains 664 square miles and supports a population of over 2 million. It lies completely within the Commonwealth of Massachusetts and contains 48 cities and towns in their entirety and portions of 17 others. The Metropolitan District Sewerage District serves 42 of these communities.

The drainage areas of the four major basins are:

Basin	Drainage Area (sq. mi.)
Mystic	65
Charles	307
Neponset	115
Weymouth Fore	37

The area is typical of a large metropolitan area with densely populated commercial and industrial core communities surrounded by suburban municipalities to form an interrelated economic and social system. The peripheral areas generally vary from suburban to rural, although in the northeast and southern sectors, the study area borders on two other smaller metropolitan systems associated with the cities of Lowell and Brockton, respectively.



LEGEND

Boston Harbor Drainage Area

Metropolitan Sewerage District

BOSTON HARBOR STUDY AREA

2a

FIGURE 1

III. PRESENT POPULATION

The 1965 population of the 65 communities which lie wholly or partially within the study area was 2,285,000.[1] Forty-two of the communities discharge their wastes to two major MDC sewerage systems. The 1965 population of these communities was 2,103,000, of which approximately 1,812,000 were served by sewerage systems. The North Metropolitan System serves about 1,276,000 persons; the South Metropolitan System about 536,000.

The remaining 23 communities outside the MDC system had a 1965 population of 182,000.[1] In 1965, 15 of these communities had no municipal sewerage system. The eight communities with sewerage systems served about 25,000 persons.

The 1965 population of each community and population served by sewerage systems is shown on Table 1. The Table is divided into two parts--communities served by the MDC and communities within the study area that are not served by the MDC.

IV. PRESENT WASTE DISCHARGES

MDC Communities

During fiscal year 1969 an average daily flow of 384 mgd[2] of primary treated sewage was discharged to Boston Harbor through the two major systems operated by the MDC. The South Metropolitan System serves 17 communities and portions of Boston, Brookline and Newton (designated S in Table 1). The sewage from this system, 105 mgd in fiscal year 1969, is conveyed to the Nut Island Treatment Plant where it is afforded primary treatment, chlorinated and then discharged to

TABLE 1

BOSTON HARBOR WATER QUALITY MANAGEMENT STUDY

1965 Population of Study Area Communities

MDC Communities

Community		1965 Population	1965 Population Served	Community		1965 Population	1965 Population Served
Arlington	(N)	52,500	52,400	Needham	(S)	29,300	22,700
Ashland	(S)	8,700	0	Newton	(N and S)	88,500	88,400
Bedford	(N)	10,800	3,100	Norwood	(S)	29,000	28,300
Belmont	(N)	28,800	23,700	Quincy	(S)	87,200	87,100
Boston	(N and S)	616,300	616,300	Randolph	(S)	21,700	2,400
Braintree	(S)	34,000	23,000	Reading	(N)	21,200	10,100
Brookline	(N and S)	53,600	53,600	Revere	(N)	42,400	39,800
Burlington	(N)	19,500	0	Somerville	(N)	86,300	86,200
Cambridge	(N)	92,700	92,600	Stoneham	(N)	20,100	17,100
Canton	(S)	15,300	5,700	Stoughton	(S)	19,700	3,700
Chelsea	(N)	27,100	27,000	Wakefield	(N)	25,600	20,000
Dedham	(S)	26,600	22,300	Walpole	(S)	16,400	4,400
Everett	(N)	43,400	43,400	Waltham	(N)	57,100	39,400
Framingham	(S)	52,400	46,200	Watertown	(N)	40,100	40,000
Hingham	(S)	17,600	1,600	Wellesley	(S)	26,300	21,800
Lexington	(N)	31,400	20,100	Westwood	(S)	12,100	2,400
Malden	(N)	56,100	56,000	Weymouth	(S)	50,500	17,200
Medford	(N)	60,400	60,400	Wilmington	(N)	15,300	0
Melrose	(N)	32,100	32,000	Winchester	(N)	21,600	21,600
Milton	(S)	27,700	25,500	Winthrop	(N)	20,400	20,400
Natick	(S)	30,400	17,000	Woburn	(N)	35,100	17,100
				TOTAL		2,103,300	1,812,000

S - Discharges to South Metropolitan System--treated at Nut Island Sewage Treatment Plant
N - Discharges to North Metropolitan System--treated at Deer Island Sewage Treatment Plant
N and S - Discharges to both systems.

TABLE 1 (Continued)

BOSTON HARBOR WATER QUALITY MANAGEMENT STUDY

1965 Population of Study Area Communities

Non-MDC Communities

Community	1965 Population	1965 Population Served	Receiving Water
Avon	5,200	0	
Bellingham	10,600	0	
Cohasset	6,600	0	
Dover	3,600	0	
Foxborough	12,200	500	Taunton River Basin - Outside Study Area
Franklin	14,700	4,500	Charles River Watershed
Holbrook	11,200	0	
Holliston	8,900	0	
Hopedale	4,400	1,400	Blackstone River Basin - Outside Study Area
Hopkinton	5,500	0	
Hull	8,800	4,400	Boston Harbor and Massachusetts Bay
Lincoln	4,500	0	
Medfield	7,500	1,000	Charles River Watershed
Medway	6,900	200	Charles River Watershed
Mendon	2,300	0	
Milford	17,000	12,000	Charles River Watershed
Millis	5,300	1,000	Charles River Watershed
Norfolk	4,000	0	
Sharon	11,300	0	
Sherborn	2,300	0	
Wayland	12,200	0	
Weston	9,800	0	
Wrentham	7,500	0	
Total	182,300	25,000	

Boston Harbor. The average BOD of the untreated waste during fiscal year 1969 was 149,000 lbs/day. The BOD discharged to the harbor after primary treatment was 95,000 lbs/day, approximately 36 percent removal. On a per capita basis, 191 gpcd (gallons per capita per day) and 0.27 pounds of BOD per capita per day are contributed to the Nut Island Treatment Plant.

Digested sludge from the Nut Island treatment plant is conveyed through a 12-inch line and discharged in President Roads which adds an additional load to the harbor. During 1969, an average of 0.28 mgd was discharged. Analyses of six sludge samples during the summers of 1968 and 1969 indicated that the BOD of the sludge approximates 5,500 pounds per day.

Twenty-two communities, plus portions of Boston, Brookline and Newton contribute wastes to the North Metropolitan System (designated N in Table 1). During fiscal year 1969 an average of 279 mgd of sewage mixed with salt water was conveyed to the Deer Island Sewage Treatment Plant and discharged to the harbor after primary treatment and chlorination. The average influent BOD during the period was 344,000 lbs/day and the effluent BOD averaged 254,000 lbs/day, about 26 percent removal.

The measured flow at the Deer Island Sewage Treatment Plant contains a substantial amount of salt water which is added to the system as a result of inoperative or broken tide gates. The average chloride content of the flow at the Deer Island Plant was 3,690 ppm (parts per million) during 1969, based on 188 daily composites analyzed

from January to September. The average chloride content of the Boston Harbor waters in the vicinity of the shoreline was approximately 15,400 ppm in 1967. Thus, assuming all chlorides originate in the ocean water, 24 percent of the measured flow of Deer Island may be attributed to salt water intrusion. The MDC and the City of Boston have recently started a program to repair and/or install tide gates that influence the Deer Island sewage flows. Reductions in flows have already occurred during 1970 as a result of this program.

Excluding salt water intrusion, the measured flow at Deer Island would average 212 mgd. Per capita sewage flow would be 159 gpcd. The per capita BOD loading before treatment averaged 0.26 lb/day of BOD during fiscal year 1969.

Digested sludge from the Deer Island plant is mixed with the liquid effluent and discharged through the main outfalls. The average volume of sludge discharged from Deer Island was 0.21 mgd during the summer of 1969. Analysis of one sample during this period showed that the sludge contributed approximately 15,000 pounds per day of BOD to the receiving waters.

Figure 2 shows the present locations of the major municipal waste discharges to Boston Harbor.

Non-MDC Communities

Only eight of the 23 non-MDC communities have municipal sewerage systems. Five of the communities discharge wastes to the Charles River, and one community discharges a portion of its waste directly to Boston Harbor. The other communities, Foxborough and

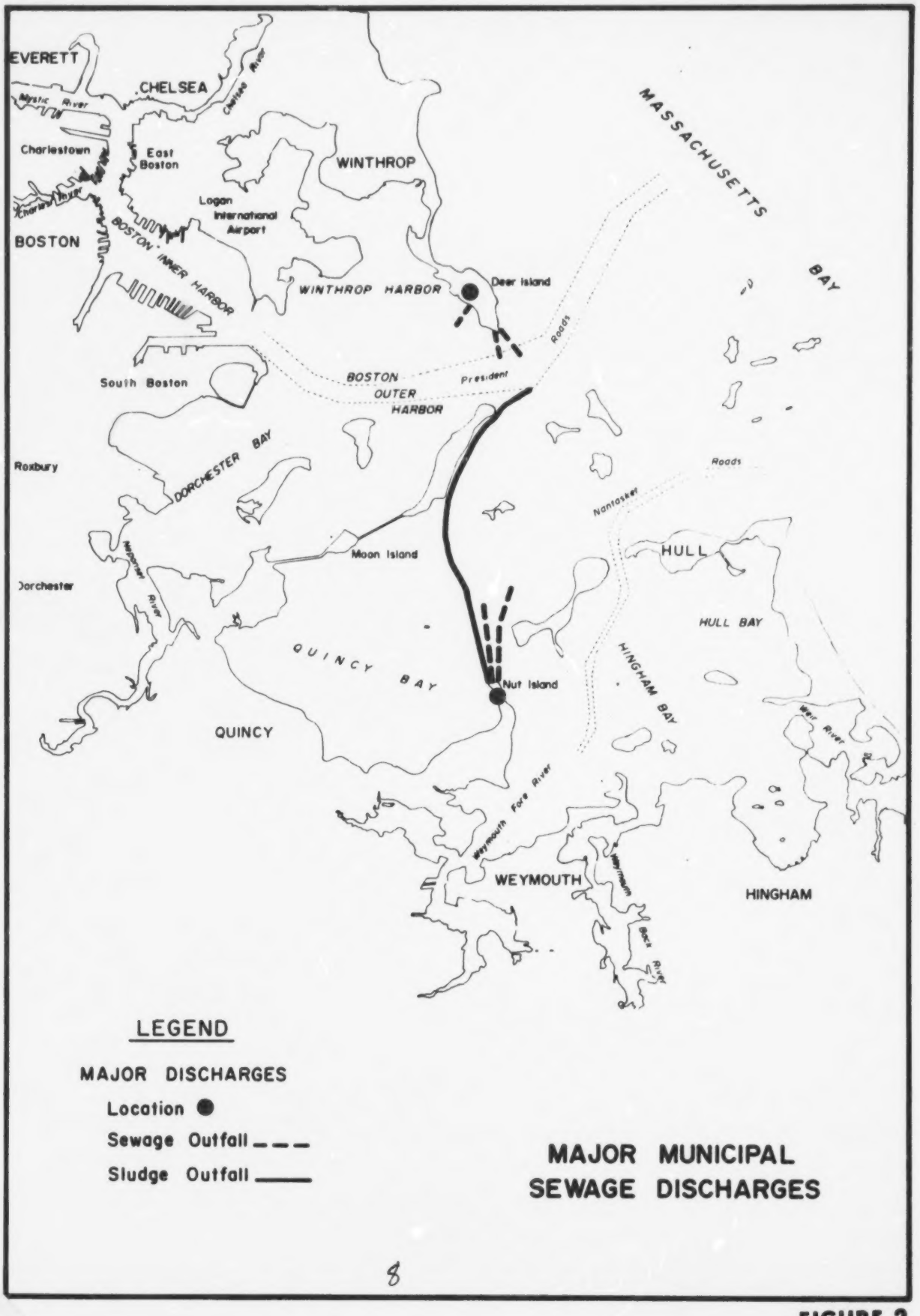

EVERETT
CHELSEA
Mystic River
Chelsea River
Charlestown
East Boston
WINTHROP
MASSACHUSETTS BAY
Logan International Airport
BOSTON
BOSTON INNER HARBOR
WINTHROP HARBOR
Deer Island
Roads
South Boston
BOSTON OUTER HARBOR
President Roads
Roxbury
DORCHESTER BAY
Nantasket Roads
Moon Island
HULL
Dorchester
Neponset River
HULL BAY
QUINCY BAY
Nut Island
HINGHAM BAY
QUINCY
Weir River
Weymouth Fore River
WEYMOUTH
HINGHAM
Weymouth Back River
LEGEND
MAJOR DISCHARGES
Location
Sewage Outfall
Sludge Outfall
MAJOR MUNICIPAL SEWAGE DISCHARGES

FIGURE 2

Hopedale, discharge wastes to basins outside of the Boston Harbor drainage area.

The estimated measured waste characteristics of the six communities that affect the waters of the Boston Harbor Drainage area are listed in Table 2.

Other Point Sources of Waste

In the Charles River Watershed approximately 0.55 mgd of industrial waste and 1.05 mgd of waste from institutions are discharged daily. Average daily BOD loads from these sources are as follows:

Industrial - Influent BOD = 1,565 lbs/day

Effluent BOD = 1,560 lbs/day

Institutional - Influent BOD = 2,340 lbs/day

Effluent BOD = 455 lbs/day

In the Neponset River Basin wastes from the Foxborough State Hospital amount to about 0.2 mgd. Estimated BOD loadings from the hospital treatment plant are 400 lbs/day influent and 60 lbs/day effluent.

All other known industrial waste dischargers to the Boston Harbor drainage area are scheduled to connect to the MDC Sewerage System.

V. FUTURE POPULATION

General

The MAPC (Metropolitan Area Planning Council), Commonwealth of Massachusetts, recently completed a report of population projections of the Metropolitan Boston Area.[3] The 1975 and 1990 populations

TABLE 2

BOSTON HARBOR WATER QUALITY MANAGEMENT STUDY

Waste Flows and BOD Loadings Contributed by Non-MDC Communities

Community	1965 Population	1965 Population Served	Receiving Water	Type of Treatment	Waste Flow (mgd)	Influent BOD (lbs/day)	Effluent BOD (lbs/day)
Franklin	14,700	4,500	Charles River Watershed	Secondary	1.2	2,960	660
Medfield	7,500	1,000	Charles River Watershed	Int. Sand Filters	.1	95	35
Medway	6,900	200	Charles River Watershed	None	.05	40	40
Milford	17,000	12,000	Charles River Watershed	Secondary	1.5	1,930	360
Millis	5,300	1,000	Charles River Watershed	Secondary	.2	370	40
Hull	8,800	4,400	Boston Harbor and Massachusetts Bay	None	.45	1,100	1,100

of 111 communities in the region were estimated. By interpolation and extrapolation of the MAPC projections, the total population of the cities and towns within the study area were estimated for the years 1980, 2000 and 2020.

The projections are consistent with projections made on a county basis by the Office of Business Economics, U. S. Department of Commerce.

The percentage of the population within each community that will be served by sewerage was based on the present percentage served and future population densities of the communities. By comparing the present percent of population served by the sewerage system with the population density in over 30 communities in the Boston area, a table of percent served per population density range was established (Table 3).

MDC Communities

Projections of those communities within the MDC are shown on Table 4. The South Metropolitan System which served 536,000 persons in 1965 is expected to serve 1,080,000 by 2020, an increase of 101 percent. The population served by the North Metropolitan System, which includes a large part of the central core, is expected to increase 33 percent by 2020 from 1,276,000 to 1,700,000 persons.

Non-MDC Communities

Population projections of the 23 non-MDC communities within the study area are shown on Table 5. Rapid growth is expected in these communities. By 2020 the population is expected to be 617,000, 238 percent greater than the present population of 182,300, and it is expected that 407,000 persons will be served by municipal sewerage systems.

TABLE 3

BOSTON HARBOR WATER QUALITY MANAGEMENT STUDY

Percent of Community Sewered
versus
Population Density

POPULATION DENSITY (Persons/square mile)	PERCENT SERVED
450 or less	0
451-540	10
541-720	20
721-1000	30
1001-1300	40
1301-1600	50
1601-1900	60
1901-2150	70
2151-2400	80
2401-2700	90
2701 or greater	100

NOTE: Percent served per population density range was based on comparing the present population served in over thirty Boston area communities with the population density of the communities.

TABLE 4

BOSTON HARBOR WATER QUALITY MANAGEMENT STUDY

Population Projections - MDC Communities

1965	Total Population	Population Served	Percent Served
South Metropolitan System	710,000	536,000	75
North Metropolitan System	1,393,000	1,276,000	92
Total	2,103,000	1,812,000	86
1980 Projection			
South Metropolitan System	830,000	698,000	84
North Metropolitan System	1,460,000	1,420,000	97
Total	2,290,000	2,120,000	93
2000 Projection			
South Metropolitan System	992,000	935,000	94
North Metropolitan System	1,590,000	1,570,000	99
Total	2,580,000	2,500,000	97
2020 Projection			
South Metropolitan System	1,110,000	1,080,000	97
North Metropolitan System	1,720,000	1,700,000	99
Total	2,830,000	2,780,000	98

TABLE 5

BOSTON HARBOR WATER QUALITY MANAGEMENT STUDY

Population Projections - Non-MDC Communities

Community	1980 Population	1980 Pop. Served	2000 Population	2000 Pop. Served	2020 Population	2020 Pop. Served
Avon	8,000	4,800	14,000	14,000	20,000	20,000
Bellingham	18,000	5,400	28,000	14,000	37,000	26,000
Cohasset	10,000	3,100	16,000	8,200	21,000	15,000
Dover	6,000	0	9,000	1,800	13,000	3,900
Foxborough	16,000	4,800	26,000	10,500	33,000	16,300
Franklin	22,000	8,800	41,000	20,500	60,000	48,000
Holbrook	15,000	10,500	21,000	21,000	27,000	27,000
Holliston	14,000	4,200	21,000	8,400	28,000	14,000
Hopedale	6,000	2,500	13,000	10,400	16,000	16,000
Hopkinton	10,000	3,000	19,000	6,600	29,000	11,500
Hull	16,000	16,000	26,000	26,000	30,000	30,000
Lincoln	9,000	1,800	13,000	4,000	17,000	6,800
Medfield	12,000	3,600	22,000	11,000	32,000	25,600
Medway	10,000	3,000	15,000	6,000	20,000	12,000
Mendon	4,000	0	6,000	0	8,000	0
Milford	24,000	17,600	33,000	26,000	42,000	42,000
Millis	9,000	2,700	16,000	8,000	22,000	13,200
Norfolk	6,000	0	11,000	2,200	17,000	6,800
Sharon	18,000	5,400	25,000	10,000	32,000	16,000
Sherborn	4,000	0	7,000	800	10,000	2,200
Wayland	18,000	7,200	30,000	23,100	40,000	37,800
Weston	14,000	4,200	22,000	13,200	30,000	18,000
Wrentham	13,000	2,600	25,000	10,000	33,000	16,500
Total	282,000	111,200	459,000	255,700	617,000	406,600

VI. FUTURE WASTE DISCHARGES

General

In studies conducted for the MAPC by Camp, Dresser and McKee, Consulting Engineers, they projected the water consumption and sewage flow of 152 Boston area communities to the years 1975 and 1990 utilizing population projections developed by the MAPC.[4] They assumed the future per capita sewage flows were equal to 85 percent of the estimated per capita water consumption, plus estimates of infiltration into the system. For this current report, the 1980, 2000 and 2020 per capita waste flows for the cities and towns in the Boston Harbor study area were estimated by interpolation and extrapolation of the Camp, Dresser and McKee data, modified in some cases and then combined with the estimates of population served to arrive at the total sewage flow of each city and town.

MDC Communities

The projected waste flows of the MDC communities do not include any estimate of salt water intrusion into the sewerage system. The MDC and the City of Boston are currently embarked on a program to rehabilitate all tide gates. With proper maintenance of the repaired tide gates, this problem should be greatly reduced or eliminated in the future.

During fiscal year 1969, the daily BOD analyses and measured sewage flow showed that the influent BOD was approximately 160,000 pounds per day for each 100 mgd of sewage flow at the Deer Island plant, and 140,000 pounds per day for each 100 mgd of sewage flow at the Nut Island plant. Projected BOD loads were based on the assumption that

for every 100 mgd of sewage there would be 160,000 pounds per day of BOD.

Table 6 is a summation of the projected flows and influent BOD loadings that will be contributed by the communities presently served by the MDC. Also shown on Table 6 are effluent loadings corresponding to primary treatment (30 percent removal of BOD) which is the present level of treatment, and secondary treatment (85 percent removal of BOD). At the present time, approximately 317 mgd and 345,000 pounds of BOD per day are discharged to Boston Harbor through the MDC system. By 2020 the BOD effluent with primary treatment is expected to be 798,000 lbs/day. If secondary treatment is afforded, the BOD effluent would be 171,000 lbs/day.

Figure 3 shows the future expected waste flows contributed by the present member communities and Figure 4 illustrates the effect of primary and secondary treatment on removing BOD.

Projections of the BOD loadings of digested sludge are shown in Table 7. The estimates assume the loadings will increase at the same rate as the projected plant influent BOD values, and that digestion efficiencies remain the same for both primary and secondary sludges.

Non-MDC Communities

Projected waste flows and influent BOD loadings of the 23 non-MDC communities within the study area are shown on Table 8. The BOD loadings were calculated by assuming each person would contribute 0.25 pounds of BOD per capita per day, which includes an allowance for industrial contributions to the sewerage system.

TABLE 6

BOSTON HARBOR WATER QUALITY MANAGEMENT STUDY

Future Waste Flows and BOD Loadings - MDC Communities

Nut Island STP

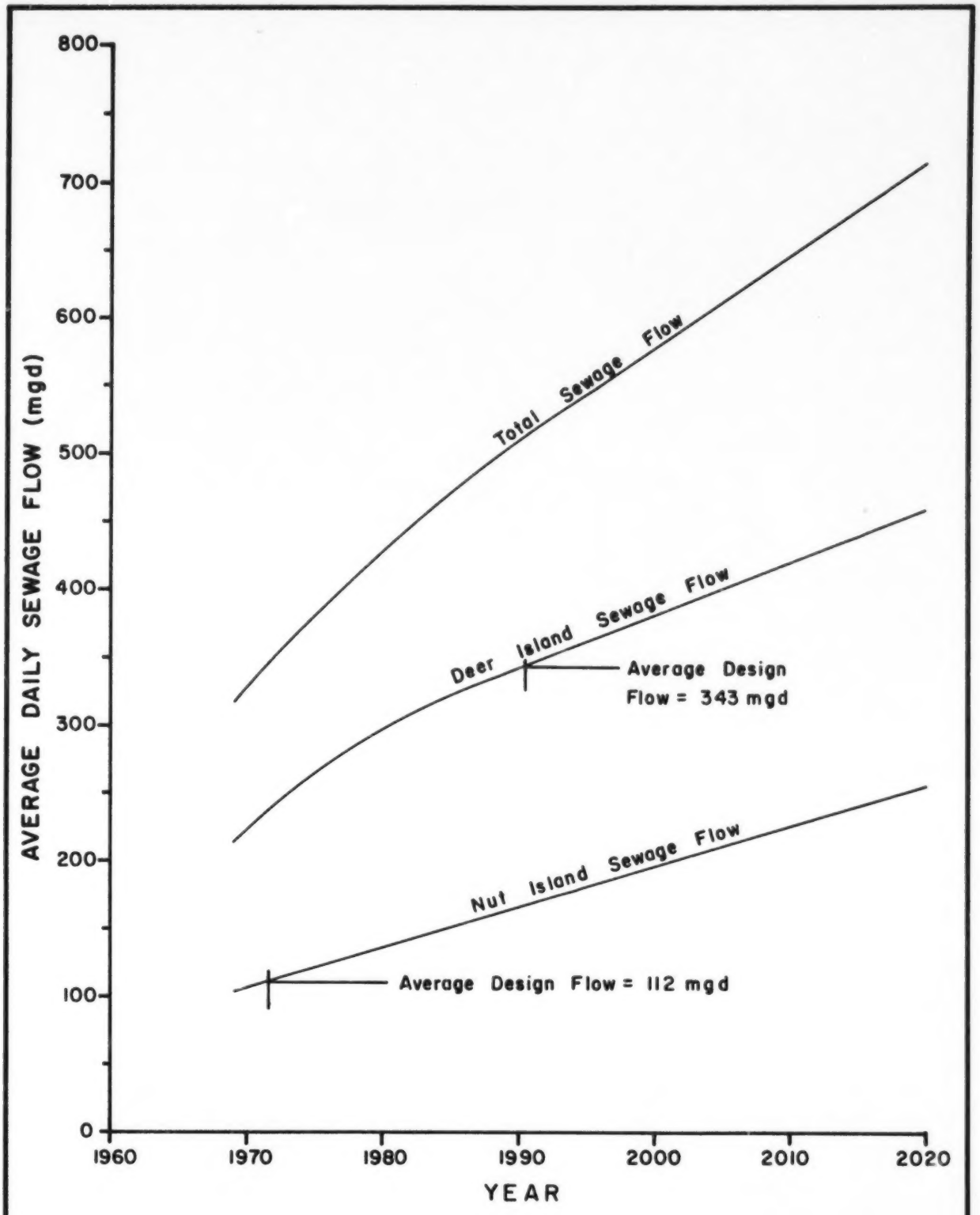
	Waste Flow mgd	Influent BOD lbs/day	Effluent BOD 30% Removal lbs/day	Effluent BOD 85% Removal lbs/day
1969	105	149,000	95,000	---
1980	132	211,000	148,000	32,000
2000	197	315,000	220,000	47,000
2020	254	406,000	284,000	61,000

Deer Island STP

	Waste Flow mgd	Influent BOD lbs/day	Effluent BOD 30% Removal lbs/day	Effluent BOD 85% Removal lbs/day
1969	212	344,000	254,000	---
1980	301	482,000	337,000	72,000
2000	382	612,000	428,000	92,000
2020	459	735,000	514,000	110,000

Totals

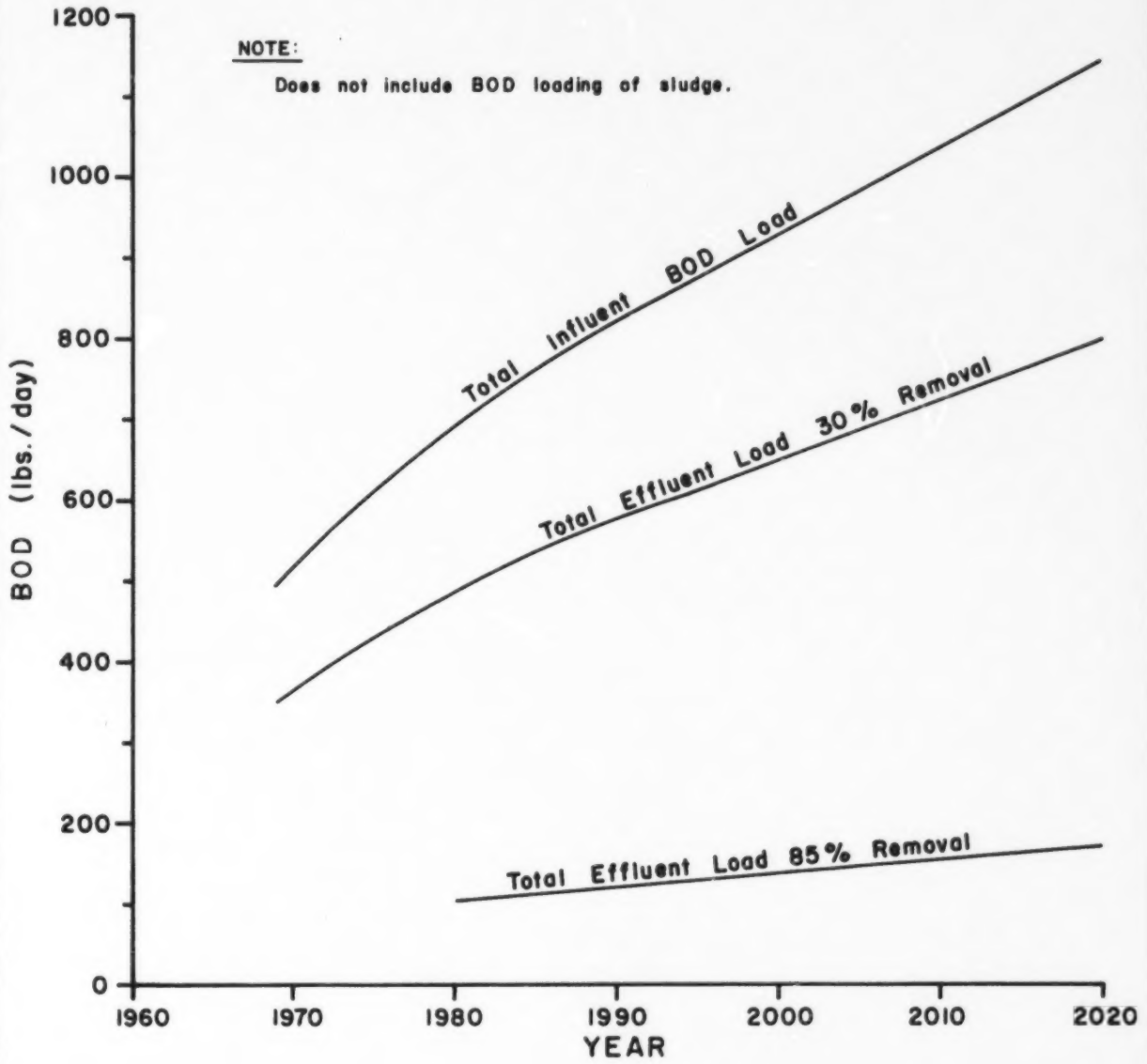
	Waste Flow mgd	Influent BOD lbs/day	Effluent BOD 30% Removal lbs/day	Effluent BOD 85% Removal lbs/day
1969	317	493,000	349,000	---
1980	433	693,000	485,000	104,000
2000	579	927,000	648,000	139,000
2020	713	1,141,000	798,000	171,000



PROJECTED SEWAGE FLOWS OF MDC SEWERAGE SYSTEMS

16a

FIGURE 3



PROJECTED TOTAL INFLUENT
AND
EFFLUENT BOD LOADINGS

MDC SYSTEM

16b

FIGURE 4

TABLE 7

BOSTON HARBOR WATER QUALITY MANAGEMENT STUDY

Future BOD Loadings of Digested Sludge
MDC Communities

Nut Island STP

	Sludge Effluent BOD Primary Treatment lbs/day	Sludge Effluent BOD Secondary Treatment lbs/day
1969	5,500	---
1980	8,000	23,000
2000	12,000	34,000
2020	15,000	43,000

Deer Island STP

	Sludge Effluent BOD Primary Treatment lbs/day	Sludge Effluent BOD Secondary Treatment lbs/day
1969	15,000	---
1980	21,000	60,000
2000	27,000	77,000
2020	32,000	91,000

Totals

	Sludge Effluent BOD Primary Treatment lbs/day	Sludge Effluent BOD Secondary Treatment lbs/day
1969	20,500	---
1980	29,000	83,000
2000	39,000	111,000
2020	47,000	134,000

TABLE 8

BOSTON HARBOR WATER QUALITY MANAGEMENT STUDY

Future Waste Flow and BOD Loadings - Non-MDC Communities

Community	1980 Waste Flow mgd	1980 Influent BOD lbs/day	2000 Waste Flow mgd	2000 Influent BOD lbs/day	2020 Waste Flow mgd	2020 Influent BOD lbs/day
Avon	0.7	1,200	2.5	3,500	4.0	5,000
Bellingham	.6	1,360	1.8	3,500	3.8	6,500
Cohasset	.3	800	.9	2,050	2.0	3,750
Dover	.0	0	.3	450	.7	980
Foxborough	1.3	1,600	3.0	3,000	4.6	4,500
Franklin	2.0	2,200	4.5	5,120	9.5	12,000
Holbrook	1.0	2,600	2.4	5,200	3.5	6,800
Holliston	.5	1,050	1.1	2,100	2.0	3,500
Hopedale	.3	620	2.5	2,600	3.6	4,000
Hopkinton	.3	750	1.1	1,650	2.3	2,900
Hull	1.8	4,000	3.5	6,500	4.8	7,500
Lincoln	.2	450	.6	1,000	1.1	1,700
Medfield	.6	1,320	1.8	3,170	4.3	6,820
Medway	.3	750	.8	1,500	1.7	3,000
Mendon	.0	0	.0	0	.0	0
Milford	2.0	4,400	3.6	6,500	6.7	10,500
Millis	.8	2,130	1.6	3,450	2.7	4,750
Norfolk	.4	1,530	.7	2,080	1.6	3,230
Sharon	1.0	1,350	2.3	2,500	3.6	4,000
Sherborn	.0	0	.1	200	.4	550
Wayland	.9	1,800	3.4	5,800	6.2	9,400
Weston	.7	1,050	2.6	3,300	4.2	4,500
Wrentham	.7	1,040	1.9	2,890	3.5	4,510
Total	16.4	32,000	43.0	68,060	76.8	110,390

In 1965 the waste flow was 3.5 mgd and the influent BOD loading was only 6,500 lbs/day (see Table 2). By 2020 the estimated waste flow is 76.8 mgd with an influent BOD loading of 110,400 lbs/day.

However, not all the communities are expected to discharge wastes to the watershed. Some are expected to connect to the MDC System, while others are likely to discharge wastes outside of the Boston Harbor study area. The probable location of waste discharge of each of the present non-MDC communities are shown on Table 9.

TABLE 9

BOSTON HARBOR WATER QUALITY MANAGEMENT STUDY

Probable Location of Future Waste Discharges - Non-MDC Communities

Community	Likely Location of Waste Discharge
Avon	Outside Boston Harbor study area
Bellingham	Portion in Charles River Watershed and a portion outside Boston Harbor study area
Cohasset	Outside Boston Harbor study area
Dover	MDC sewerage system
Foxborough	MDC sewerage system or outside Boston Harbor study area
Franklin	Charles River Watershed
Holbrook	MDC sewerage system
Holliston	Charles River Watershed
Hopedale	Outside Boston Harbor study area
Hopkinton	Outside Boston Harbor study area
Hull	Boston Harbor and/or outside Boston Harbor study area
Lincoln	Charles River Watershed or MDC sewerage system
Medfield	Charles River Watershed
Medway	Charles River Watershed
Mendon	Outside Boston Harbor study area
Milford	Charles River Watershed
Millis	Charles River Watershed
Norfolk	Charles River Watershed
Sharon	MDC sewerage system
Sherborn	Charles River Watershed
Wayland	Outside Boston Harbor study area
Weston	MDC sewerage system
Wrentham	Charles River Watershed

VII. REFERENCES

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3. The Commonwealth of Massachusetts, Projected Population, 1990, Metropolitan Area Planning Council, Boston, April, 1968.

4. Camp, Dresser and McKee, Consulting Engineers, Inventory of Water and Sewer Facilities, prepared for Metropolitan Area Planning Council, Department of Commerce and Development, Commonwealth of Massachusetts, Boston, March, 1967.